



**Rehabilitation
& Performance**
INSTITUTE

The
Sacroiliac Joint
& Hip



The Sacroiliac Joint & Hip

ASSESS

Process of Assessment

Previously in our discussions, most diagnoses are straight forward or are easy to rule in or out. Moving into this region of our anatomy, patient's diagnoses and situations become increasingly more difficult.

Common question: How do I come to a conclusion that the diagnosis I have decided on is truly that diagnosis?

Answer: One of the most common mistakes made by novice clinicians is deciding what diagnosis belongs to that particular patient prematurely. You can become biased by diagnostic imaging, the words on the script, or even a patient's subjective information.

When you get a set diagnosis in your head prematurely, you can rule out (R/O) other diagnoses without having adequately tested for them. Remember, we are practicing with evidence-based practice. Each special test has a particular specificity and sensitivity that can rule in (R/I) or rule out (R/O) a particular tissue in lesion or condition. It is important to play "devil's advocate" with your preconceived notions so that you do not inadequately or prematurely diagnose your patient.

If you are not sure, keep testing. Utilize the SFMA to look at movement dysfunctions rather than focus on a particular tissue dysfunction. Try to prove yourself wrong. If all else turns up clear, you are probably right and can remain confident in that. Otherwise, if you cannot come up with a definitive diagnosis, be honest with your patient. You have a decision to make: is this patient a good candidate for PT? Are there any red flags? Are there biomechanical deficits you think are contributing to their pain that may not be the source that you can address/ explore?

You must know what your "special tests" are specifically testing. Otherwise, your examination is null and void. If the SFMA is not playing its role in a specific patient scenario. You should be able to specifically identify a tissue in lesion and have a clear plan to address it.

Diagnostic Testing-Clinical Reasoning Skills	
Tissue Testing	Indications
Skin	Pain with palpation Pain with stretch
Subcutaneous	Pain with palpation Pain with stretch
Ligament	Pain with palpation Pain with stretch Pain/ restriction to both AROM/ PROM in the same direction but not painful with resistance
Muscle/ Tendon	Pain with palpation Pain to contraction in the inner, mid, outer ranges Pain to stretch AROM/PROM are painful/ restricted in opposite directions
Joint Capsule	Pain with palpation Pain with stretch Decreased pain with capsule is on slack Pain with ipsilateral multifidus contraction
Bursae	Pain with compression
Joint Cartilage	Pain with joint compression Joint crepitus AROM/PROM are painful/ restricted in the same direction Joint mobility limited grade 1-2
Joint entrapment	Pain with joint compression Joint mobility grades 0-2 No joint crepitation
Nerve	Sensation changed Myotomes and reflexes changed Nerve tension tests Quadrant testing (maximum foramen closure) Tinnel's, Door Bell, TOS, CN testing Valsalva
Disc	Pain with compression Shear testing Valsalva
Bone	Vibration Percussion X-ray
Vascular	Vertebral a. testing Doppler TOS testing Valsalva

Hip Assessment

Initial observation

- Gait pattern, limp, use of aids, speed of movement
- Wt preferences, one leg more than the other
- Note the pts sitting posture (i.e: more weight on one hip vs. the other)
- Note habitual standing posture
- Color changes, contour changes of swelling or atrophy, scars, abrasions, skin folds
- Skin palpation for temperature, moisture, tenderness, paresthesia, tone. Compare bilaterally

AROM

- Quick tests (weight bearing)
 - Gait: walking forward/backwards-watch for pelvic drop or inclination, development of excessive lordosis
 - Hopping on one leg
 - Hip flexion during a squat or pull knees to chest
 - Hip internal and external rotation: wt bearing, single limb stance rotation, rotate leg on heel
- Quick tests (non-weight bearing)
 - Hip flexion and adduction: sit, cross one thigh over the other
 - Hip flexion, abduction, external rotation: sit and place the lateral side of the foot on the opposite knee
 - Internal rotation with hip flexed and hip extended
 - External rotation with hip flexed and hip extended
 - Hip flexion with knees flexed and extended
 - Hip extension with knees flexed and extended

PROM-compare all bilaterally

- Extension with knee extended and flexed
- Internal rotation with hip extended and knee flexed
- External rotation with hip extended and knee flexed
- Flexion with knees flexed and extended
- Adduction with hip and knee extended and with hip and knee flexed
- Internal rotation with hip and knee flexed
- External rotation with hip and knee flexed

Resisted Testing

- Coxafemoral Joint
 - Flexion-knee flexed and extended
 - Extension-knee flexed and extended
 - Internal rotation-knee and hip flexed
 - External rotation-knee and hip flexed
 - Abduction-with hips and knees flexed and extended
 - Adduction-hip and knees flexed and extended

Palpation

Posterior and lateral aspect

- Prone
 - Gluteus Maximus: have pt squeeze buttocks together, palpate bilaterally
- Sidelying
 - Greater trochanter: flex hip and knee, check possible bursa swelling-will feel boggy and tender
 - TFL: snapping lateral hip with flexion
 - Sciatic Nerve: midway between greater trochanter and ischial tuberosity
 - Ischial tuberosity and bursa and sacrotuberous ligament
 - Hamstring muscles

Anterior and medial aspect

- Supine with hip and knee extended
 - Rectus femoris: AIIIS and down
 - Quadriceps
 - Inguinal ligament: from ASIS to pubic tubercle
 - Sartorius: slight under ASIS to knee
 - Adductor Longus: from pubic symphysis to mid thigh
 - Gracilis

Neurology

- Myotomes
 - T12: Ext and Int. oblique, thoracic nerves T7-L2
 - L1-3: Iliopsoas, Femoral N L2-3, lumbar plexus
 - L3: Rectus femoris, femoral N L2-4
 - L5: Hamstrings, sciatic N L4-5, S1
 - S1: Gluteus med/min, Superior Glut. N L4-5, S1
 - S2: Gluteus Maximus, Inferior Glut. N L5, S1-2
- Reflexes:
 - L3: Patellar tendon reflex
 - L5: Proximal hamstring reflex
 - S1: Gluteus Maximus Reflex
- Sensation
 - L1-2: lumboinguinal nerve-superior medial aspect below the inguinal ligament
 - L2-anterior femoral cutaneous N-medial front half of the thigh
 - L3-anterior femoral cutaneous N-medial front half of the thigh
 - L4-lateral femoral cutaneous N-lateral front half of the thigh and knee
 - L5-common peroneal N-lateral anterior calf
 - S1-2-Posterior Femoral Cutaneous-posterior aspect of the thigh

Special Testing

- Fulcrum Test: femoral stress fractures
- Femoral N Neural Tension Test
- Modified circumduction test
- Craig's Test-tests degree of anteversion
- OBER Test: Tests ITB flexibility
- Patrick FABER

- Scour Test: tests for crepitus
- Thomas Test: Tests rectus femoris, Iliopsoas and ITB tightness
- Trochanteric Bursitis Test
- FADIR test: Good specificity to detect groin pain of labral origin
- Hip OA CPR
 - Hip pain, IR less than 15, pain with passive hip IR, morning stiffness up to 60 minutes, age greater than 50.
 - If all are present SN=.86, SP=.75

Mobility Testing

- Open pack position
 - Lateral distraction
 - Inferior glide
 - Lateral glide
- Resting position over edge of table
 - Anterior glide (prone)
 - Posterior glide (supine)

SFMA: Breakout for Multisegmental Rotation Pattern

Spine	Hip	Tibia
Seated rotation with hips flexed to 90 degrees (50 degrees)	Active seated hip IR (30 degrees) Passive seated hip IR (30 degrees)	Active seated tibial ER with foot in contact with ground (20 degrees) Passive seated tibial ER with foot in contact with ground (20 degrees)
Active lumbar locked rotation in ER (50 degrees) - If not FN, active LL in IR Passive lumbar locked rotation in IR (50 degrees)	Active seated hip ER (40 degrees) Passive seated hip ER (40 degrees)	Active tibial IR with foot in contact with ground (20 degrees) Passive tibial IR with foot in contact with ground (20 degrees)
Active prone on elbow rotation (30 degrees) Passive prone on elbow rotation (30 degrees)	Active hip IR in prone (30 degrees) Passive hip IR in prone (30 degrees) Active hip ER in prone (40 degrees) Passive hip ER in prone (40 degrees)	

Sacroiliac Joint Assessment

History /Inspection

- Posture of the spine
- Gait, limp, foot drop, decreased weight bearing
- General standing inspection:
 - Lateral: hip, knee, pelvic angle, spinal curves, position of the head, ASIS compared to PSIS levels
 - Anterior: Mortise angle to the tibial tuberosity, patellar direction, Q angle, iliac crests level, clavicles

AROM

- Quick Tests
 - Forward flexion test (Varlauf's Phenomena)-pt flexes forward, PT palpates at PSIS, if one PSIS move upward more than the other, this is the affected side and it is hypomobile because the sacrum does not nutate. Hamstrings are often contracted on the unaffected side
 - Rucklauf Phenomena-knees to chest in standing, palpate PSIS for clicking or pain.
 - Leg length Test: True vs. Functional
- Active Movements-Standing
 - Test trunk flexion, extension, side bending but palpate the PSIS for movement.
 - Hip flexion-PT palpating at pelvis-for normal movement should see pure knee flexion, hip flexion, posterior rotation of innominate, sacral extension, lumbar flexion
- Active Movements-Sitting
 - Palpate PSIS and ASIS for differences in standing and sitting. If PSIS/ASIS is off in standing and equal in sitting then suspect leg length discrepancy.

Palpation

- Prone:
 - Supraspinatous and infraspinatous ligaments, Iliolumbar ligaments, SI joint line, greater trochanter, ischial tuberosity, sacrotuberous and sacrospinous ligaments
- Supine:
 - ASIS Level, pubic tubercle, inguinal ligament
- Supine ligamentous provocation tests
 - Knees to chest for longitudinal posterior sacroiliac ligament. Resist hip flexion to clear hip flexors
 - Knee to opposite shoulder for oblique sacroiliac ligaments
 - Knee to opposite hip for transverse sacroiliac ligaments

Neurology

- Same as lumbar spine

Special tests

- Straight leg Raise
- Thomas Test (hip flexor)
- OBER test (TFL and IT Band)
- Stork Test-assess hypomobility of the SI joint
- SI joint Provocation tests

- Distraction test: Sn=.98
- Compression test: Sn=.98
- Thigh Thrust: Sn=.80, Sp=.80
- Gaenslen
- FABER
- Sacral Thrust
- SI CPR (Laslett, et al) (**YouTube**)
 - Thigh thrust, compression, distraction, sacral thrust, Gaenslen
 - If 3/5 are positive the Sn=.91, Sp=.87

Specific Mobility Testing

- Forward rotation of the ilium
- Backward rotation of the ilium
- Gapping of the SI joint
- AP glide of the SI joint

Other Considerations for Assessment: Pelvic Floor Muscle Health for men and women and OBGYN history for women

RESET THE SYSTEM

Innominate Rotation Mobilizations

- Posterior innominate correction (**YouTube**)



Grab onto ASIS and ischial tuberosity to counter-rotate pelvis into anterior direction.

- Anterior innominate correction (**YouTube**)



Grab onto ASIS and ischial tuberosity or PSIS to counter-rotate pelvis into posterior direction.

Sacroiliac Joint Mobilizations

- Sidelying Gapping
- Posterior glide (between PSIS and S2)

Sacroiliac Isometrics

- Mobilization of the Ilium in the Sagittal Plane



Patient supine with both hips flexed to 90 degrees. Push R hip into flexion and pull L hip into extension while asking the patient to “hold.” Then, reverse the procedure.

- Mobilization of the Ilium in the Transverse Plane



Patient supine with the hip in 90 degrees flexion. Push medially asking the patient to hold against you (other hand stabilizes opposite side of pelvis).

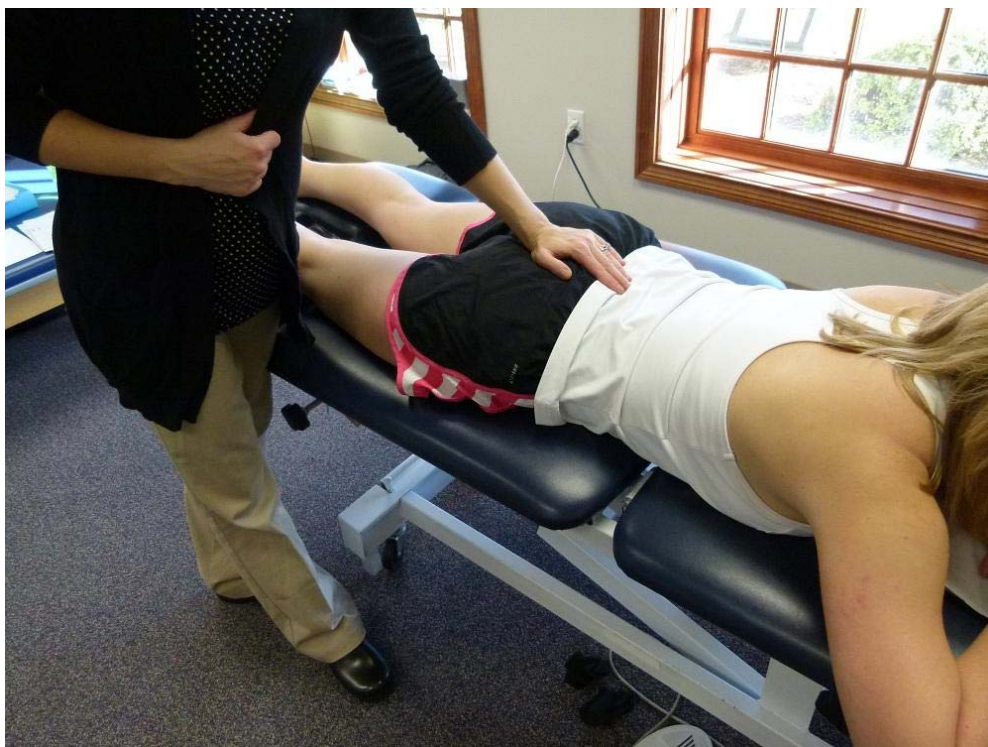


*Move the hip to 45 degrees and adducted.
Pull hip towards extension asking patient to resist.*

- Mobilization of the Sacrum in the Sagittal Plane



*To range into flexion, heel of the hand is placed on the base of the sacrum and command is to exhale.
Follow into flexion and hold until inhalation.*

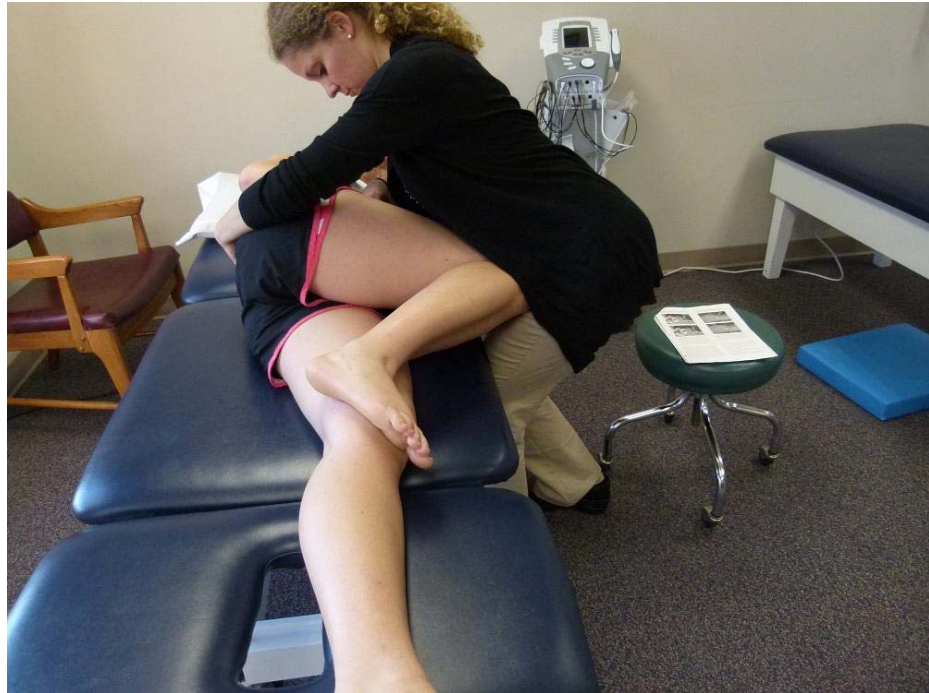


To range into extension, heel of hand is placed on apex of sacrum and patient is asked to inhale. Follow into extension and hold until exhalation.

- Mobilization of the Sacrum in the Sagittal Plane



Pt. is in sidelying. Uppermost hip in 90 degrees flexion. Trunk is moderately rotated. PT pushes shoulders away and pelvis towards with isometric contraction of the multifidi.



Position does not change. Therapist pushes down on the knee to fire the piriformis.

Considerations: Use your body and their legs for leverage

Hip Mobilizations

Hip (Convex on Concave)

- Long axis Hip Distraction



Use belt and body weight with hip in open-packed position (30 degrees flexion, 30 degrees abduction, 30 degrees ER).

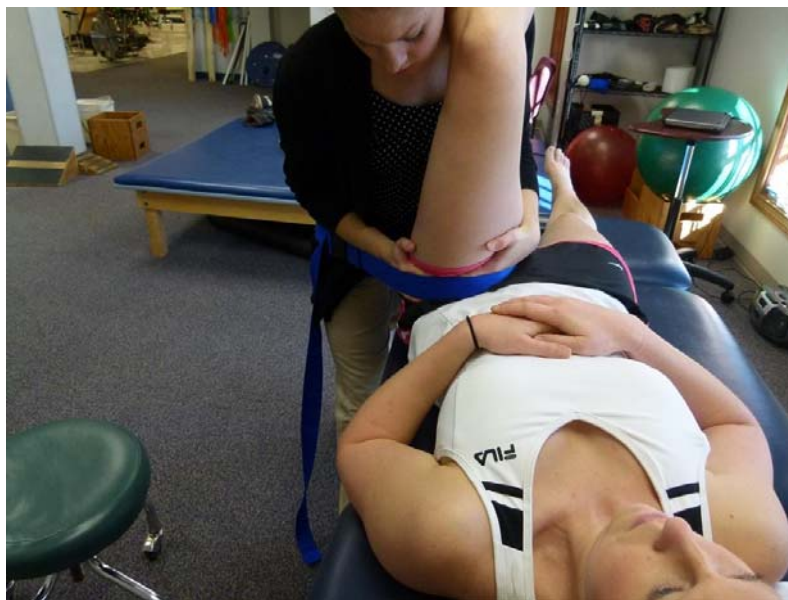
May also put 1 belt across stomach or opposite hip for additional stabilization.

Can manipulate in this position.

- Distraction
- Mobilization of the Hip: Arthrokinematics change depending on the plane of joint.
 - Neutral
 - Posterior»IR
 - Anterior»ER
 - Superior»ADD
 - Inferior»ABD
 - 90 degree flexion
 - Posterior»ADD
 - Anterior»ABD
 - Superior»ER
 - Inferior»IR



*Lateral distraction. Still in 30/30/30 position.
Can use a towel if it is uncomfortable for patient.*



Inferior Glide.

- Prone PA glide of the hip in order to increase extension in neutral or figure 4 position
- Posterior glide of the hip with leg crossed

Considerations:

- Mechanoreceptor=type I
- Open-packed position: 30 deg flex, 30 deg ABD, 30 deg ER
- Use mobilization belts as needed

Functional Dry Needling

- Assess soft tissue mobility and presence of myofascial trigger point

Manual Techniques to Reset Multi-segmental Rotation Breakouts:

Purpose	Technique	Set Up	Direction of Force
Resolve TED limiting thoracic rotation	STM/IASTM to thoracic paraspinals	Pt in prone	Along and across fibers
Resolve JMD limiting thoracic rotation	PA manipulation to specific vertebrae	Pt in prone or in supine	Force is straight PA in line with elbows
Resolve TED limiting lumbar rotation	STM/IASTM to lumbar paraspinals	Pt in prone or sidelying	Along and across fibers
Resolve JMD limiting lumbar rotation	Sidelying lumbar mobilization or manip	Pt in sidelying with top hip flexed while assessing lumbar vertebrae then placed where needed, upper body is rotated away to lock out T/S	Force is downward toward table and slightly rotational
Resolve TED limiting hip ER	STM/IASTM to glutes, TFL, adductors	Pt in supine, sidelying or prone	Along and/or across fibers
Resolve JMD limiting hip ER	Anterior hip mobilization	Pt in prone. PT hand placement raises hip into slightly extension, other hand is placed at proximal femur	PA force is applied through hand on femur
Resolve TED limiting hip IR	STM/IASTM to glutes, obturators, piriformis, gemellus mm, sartorius	Pt in supine, sidelying or prone	Along or across fibers
Resolve JMD limiting hip IR	Inferior and posterior hip mobilization with belt and slight distraction	Posterior: Pt in supine with ankle of limited hip crossed over other extended leg. Inferior: Pt is supine on edge of table, strap belt on proximal femur and around PT hips.	Posterior: Pressure is applied using PT's shoulder in AP direction in line c pt's femur. Inferior: Pressure is applied by PT sitting back on belt to allow for distraction and inferior glide of proximal femur.
Resolve TED limiting tibial ER	STM/IASTM to medial hamstrings, gracilis, popliteus, sartorius, medial gastrocsoleus, PNF stretching	Pt in supine or prone	Force applied in direction of fibers or across fibers, various techniques
Resolve JMD limiting tibial ER	Tibial ER mobilization in closed chain	Pt in hooklying position with knee bent at 40 degrees. PT sits on foot to stabilize, places hands at joint line on both sides of knee.	Force is applied with both hands to externally rotate tibia on femur
Resolve TED limiting tibial IR	STM/IASTM to biceps femoris, lateral gastroc-soleus, PNF stretching	Pt in prone	Various techniques
Resolve JMD limiting tibial IR	Tibial IR mobilization in closed chain	Pt in hooklying position with knee bent at 40 degrees. PT sits on foot to stabilize, places hands at joint line on both sides of knee.	Force is applied with both hands to internally rotate tibia on femur

REINFORCE THE CORRECTION

Patient Education:

- Restrictions/ activity modification
- Postural education
- ADLs/ ANLs
- Driving
- Sleeping positions
- Appropriate lifting mechanics
- Appropriate exercise

Basic Reinforcement Interventions:

- “The Stick” – Reinforces any soft tissue work and helps remove additional TEDs
 - Along ITB, piriformis, gluteal musculature
- Foam Roller- Reinforces any soft tissue work and helps remove additional TEDs
 - Rolling along lumbar spine paraspinals
 - Piriformis, hip flexor, gluteal, hamstring, and ITB rolling
- Stretches- assisting with various TEDs
 - Piriformis, hamstrings, ITB, lumbar paraspinal, hip internal and/or external rotators, hip add

Bracing: SIJ Belt- helps with ligamentous laxity and stabilization of the SIJ

Reinforcement Techniques for Multi-segmental Rotation Breakout:

Purpose	Technique	Set Up or Directions
Decrease thoracic TED	Foam roll to thoracic paraspinals	Lie on foam roller with hips flexed and roll back and forth over thoracic spine
Increase thoracic joint mobility	Sidelying thoracic open up stretch	Lie on side with bottom leg extended and top hip flexed to 90 degrees. Take top arm around to table behind.
Increase L/S extension/rotation	Prone press up stretch	Lie on stomach and press up until elbows are straight allowing hips to remain on table
Decrease hip ER TED	Tennis ball massage to glutes	Pt in supine with tennis ball placed under tissue
Increase hip ER joint mobility	Pigeon pose for anterior self mobilization	On floor or on table with treated leg in extension. Toes are curled under and leg extension is performed while in pigeon pose.
Decrease hip IR TED	Cross body glute stretch	Supine with scapula in contact with table while affected leg is pulled across body
Increase hip IR joint mobility	Self MWM using band for lateral distraction	In supine with band around proximal thigh with resistance providing lateral distraction. Active IR in 90 degrees hip flexion is performed.
Increase tibial IR motion	Self IR mobilization in half kneeling	Place one hand on posterolateral aspect of fibula and other hand at tibial tuberosity. Push forward on fibula and pull medially at tibia during CKC dorsiflexion motion.
Increase tibial ER motion	Self ER mobilization in half kneeling	Place one hand on posterolateral aspect of tibia and other hand at anterior fibula. Push forward on tibia and pull medially at fibula during CKC dorsiflexion motion.

RELOAD THE SOFTWARE

Once mobility is established at the dysfunctional joint, treat as a SMCD and reload the system so that the patient can utilize their new mobility in a functional manner.

<i>Corrective Matrix TO INCREASE HIP ROTATION</i>				
<i>Posture</i>	Standing	Single leg stance upper body rotation pushing into theraball at wall for core assist	Single leg stance upper body rotation on own without support	Single leg stance with resistance at upper body using cook band at shoulders
	Stacked Spine (Kneeling)	Kneeling hip rotation on stool with pulley providing core resistance	Kneeling hip rotation on stool without core assist	Kneeling hip rotation on stool with resistance at ankle
	Suspended Spine (Quadruped)	Q-ped fire hydrant with therapy ball under abdomen for stability support	Q-ped fire hydrant without assist	Q-ped fire hydrant on toes or with resistance band around knees
	Supported Spine (Supine/Prone)	Starfish rolling with tband held in opposite hand and around opposite foot for stability aid	Starfish rolling without assist	Starfish rolling with resistance at pelvis
		Facilitate (Expresses Mobility)	Demonstrates (Expresses Competency)	Challenges (Expresses Motor Control)
<i>Corrective Matrix TO INCREASE TIBIAL ROTATION</i>				
<i>Posture</i>	Standing	Single leg stance hip rotation and assist given with cook band while lower leg is stable	Single leg stance body rotation on own without support	Single leg stance with cook band around hips providing resistance while lower leg is stable
	Stacked Spine (Kneeling)	½ kneeling with self assist for rot w foot on moving disc	½ kneeling with active rotation with foot on moving disc	½ kneeling with resistance at knee or ankle w foot on disc
	Suspended Spine (Quadruped)	Tibial rotation with leg extended/tband at wrists for core aid	Tibial rotation with leg extended, no aid	Resisted tibial rotation with leg extended
	Supported Spine (Supine/Prone)	PNF stretching in supine with knee bent to 90 degrees and PT providing resistance	Long sitting active motion with hands stabilizing at knee	Resisted tibial rotation in long sitting using band
		Facilitate (Expresses Mobility)	Demonstrates (Expresses Competency)	Challenges (Expresses Motor Control)